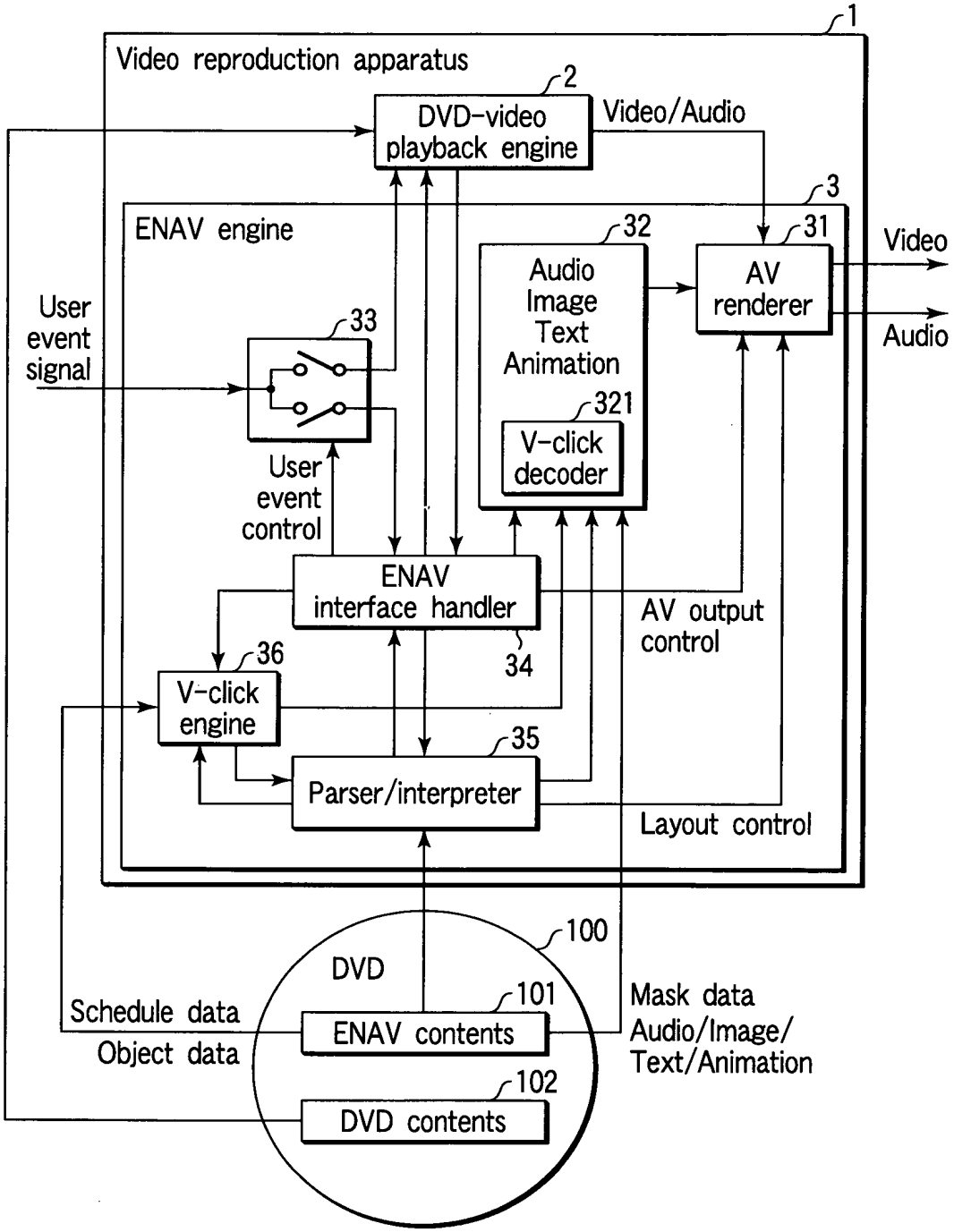
1
Video reproduction apparatus
2
DVD-video playback engine
Video/Audio
3
ENAV engine
32
Audio Image Text Animation
321
V-click decoder
31
AV renderer
Video
Audio
User event signal
33
User event control
ENAV interface handler
34
AV output control
36
V-click engine
35
Parser/interpreter
Layout control
100
DVD
101
ENAV contents
Schedule data
Object data
Mask data
Audio/Image/
Text/Animation
102
DVD contents

FIG. 1

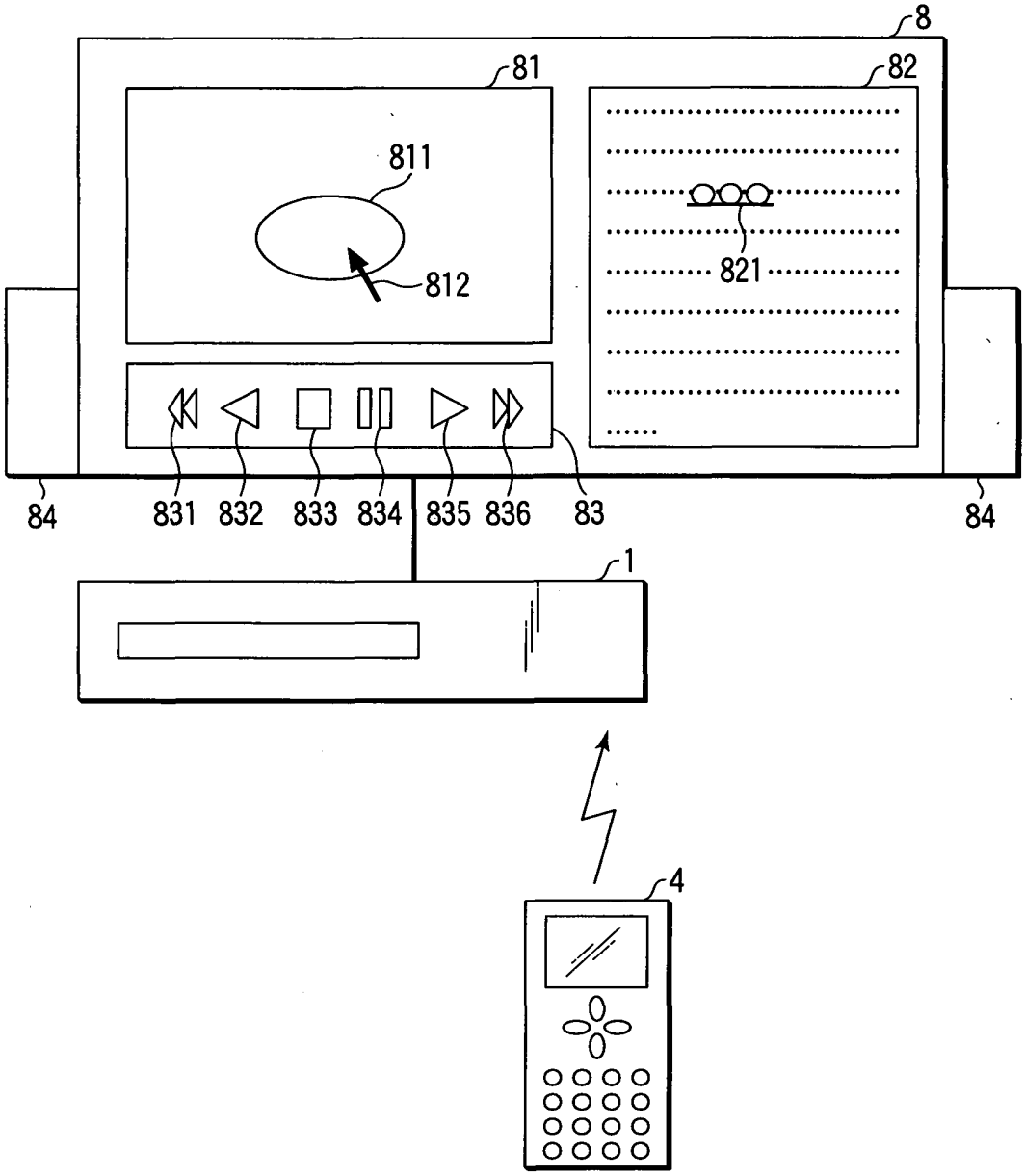

FIG. 2

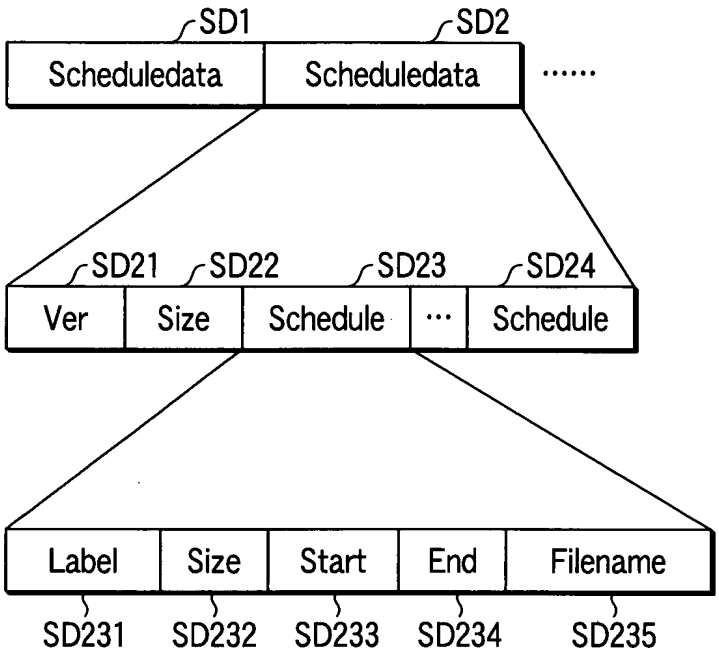
SD1
SD2
Scheduledata
Scheduledata
.....
SD21
SD22
SD23
SD24
Ver
Size
Schedule
...
Schedule
Label
Size
Start
End
Filename
SD231
SD232
SD233
SD234
SD235

FIG. 3

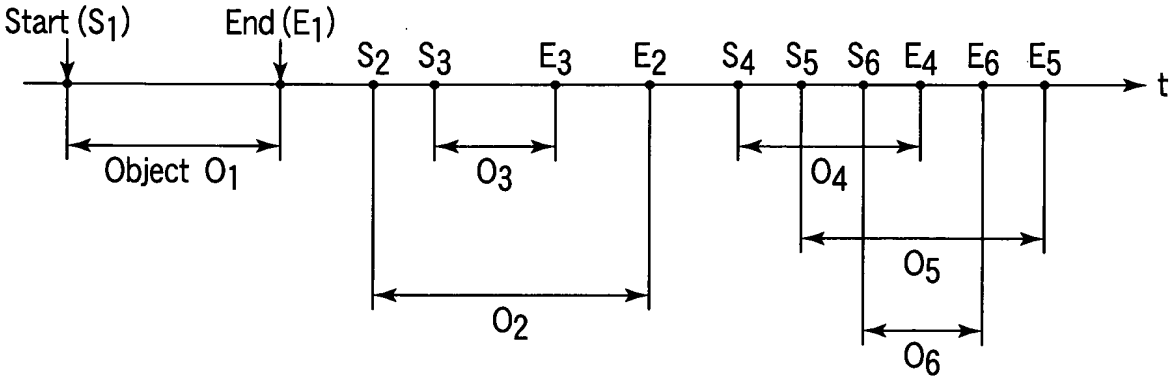
Start (S1)
End (E1)
S2
S3
E3
E2
S4
S5
S6
E4
E6
E5
t
Object O1
O3
O4
O5
O2
O6

FIG. 4

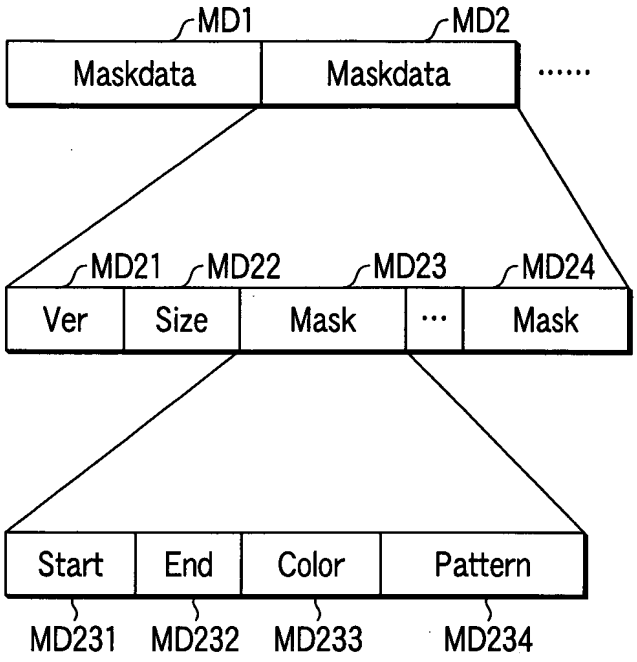
MD1
MD2
Maskdata
Maskdata
.....
MD21
MD22
MD23
MD24
Ver
Size
Mask
...
Mask
Start
End
Color
Pattern
MD231
MD232
MD233
MD234

FIG. 5

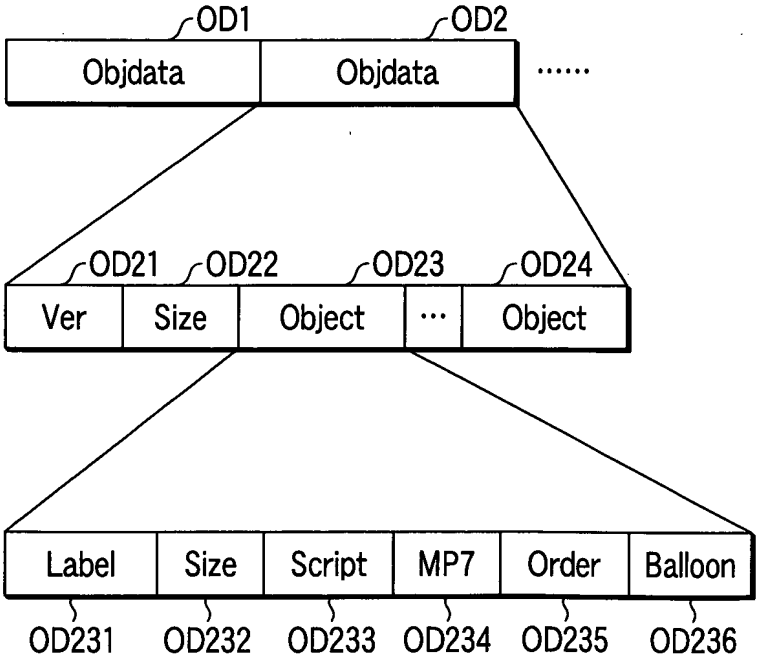
OD1
OD2
Objdata
Objdata
.....
OD21
OD22
OD23
OD24
Ver
Size
Object
...
Object
Label
Size
Script
MP7
Order
Balloon
OD231
OD232
OD233
OD234
OD235
OD236

FIG. 6

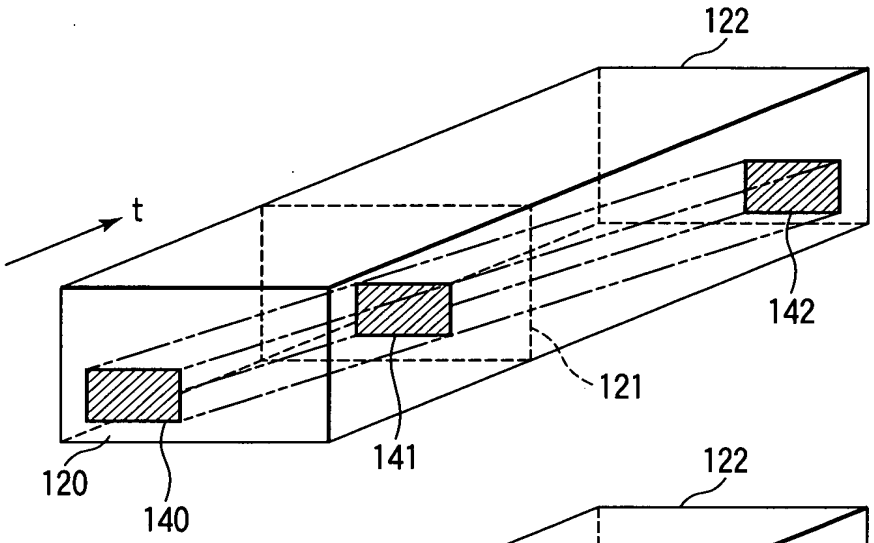

FIG. 7A

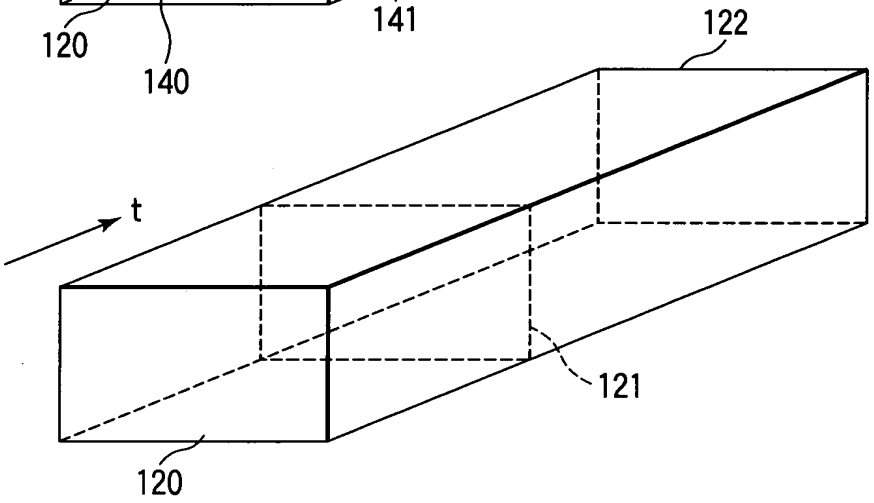

FIG. 7B

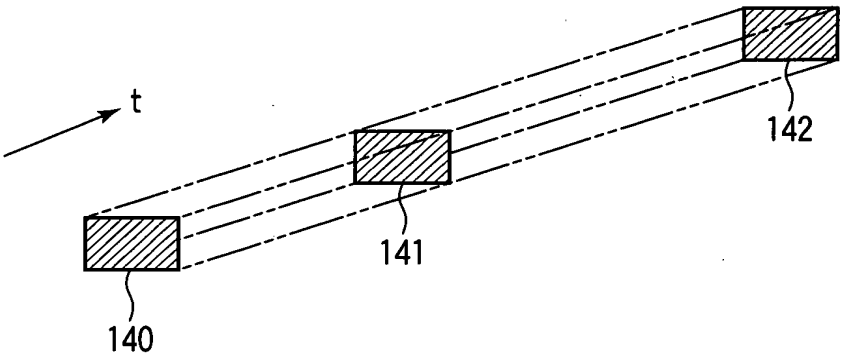

FIG. 7C

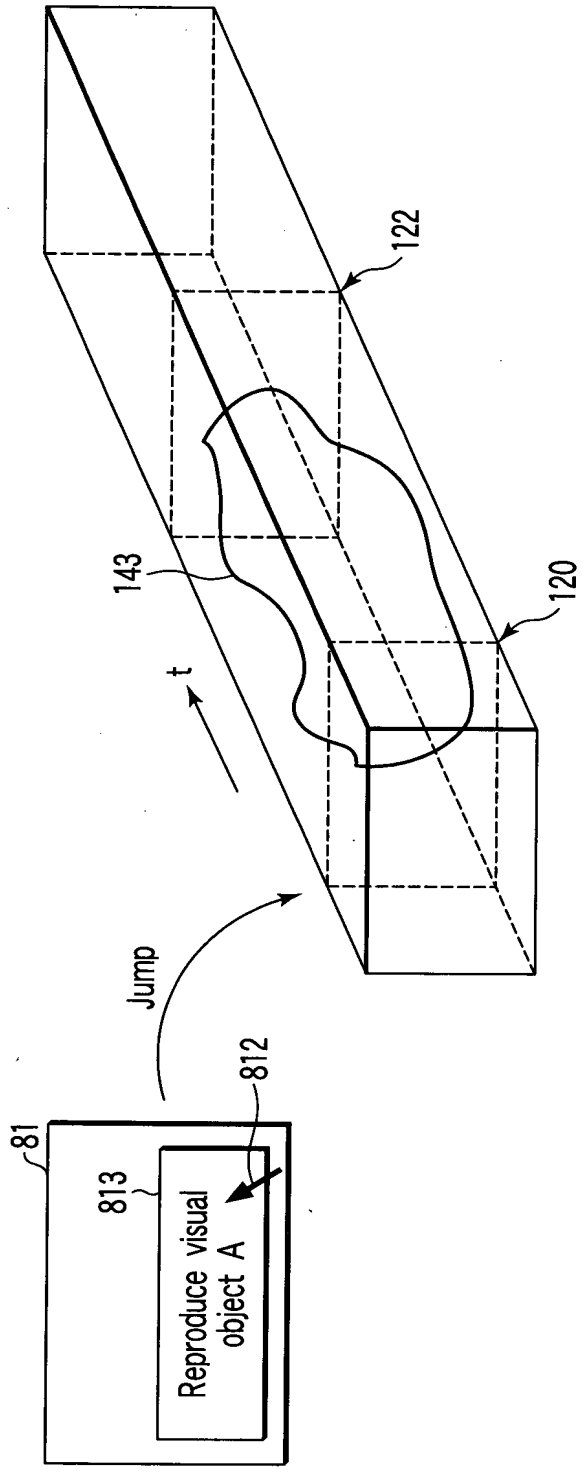

FIG. 8

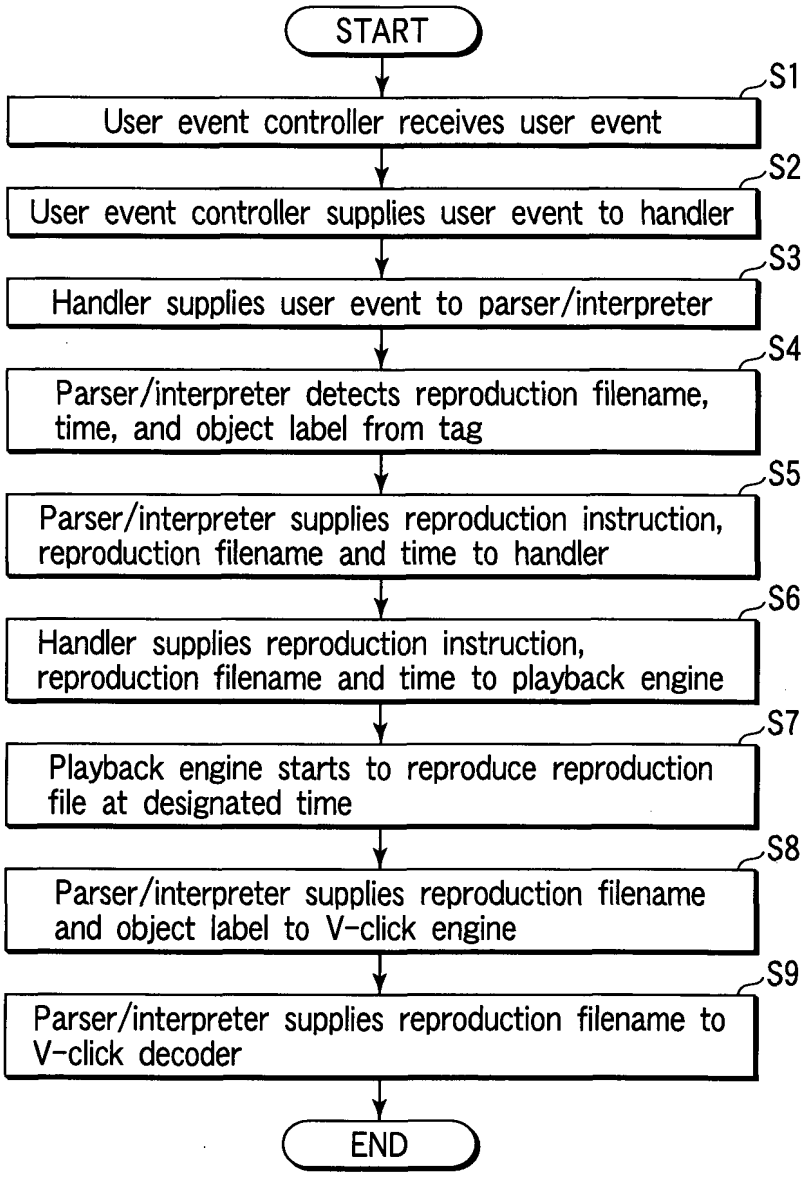
START
S1
User event controller receives user event
S2
User event controller supplies user event to handler
S3
Handler supplies user event to parser/interpreter
S4
Parser/interpreter detects reproduction filename, time, and object label from tag
S5
Parser/interpreter supplies reproduction instruction, reproduction filename and time to handler
S6
Handler supplies reproduction instruction, reproduction filename and time to playback engine
S7
Playback engine starts to reproduce reproduction file at designated time
S8
Parser/interpreter supplies reproduction filename and object label to V-click engine
S9
Parser/interpreter supplies reproduction filename to V-click decoder
END

FIG. 9

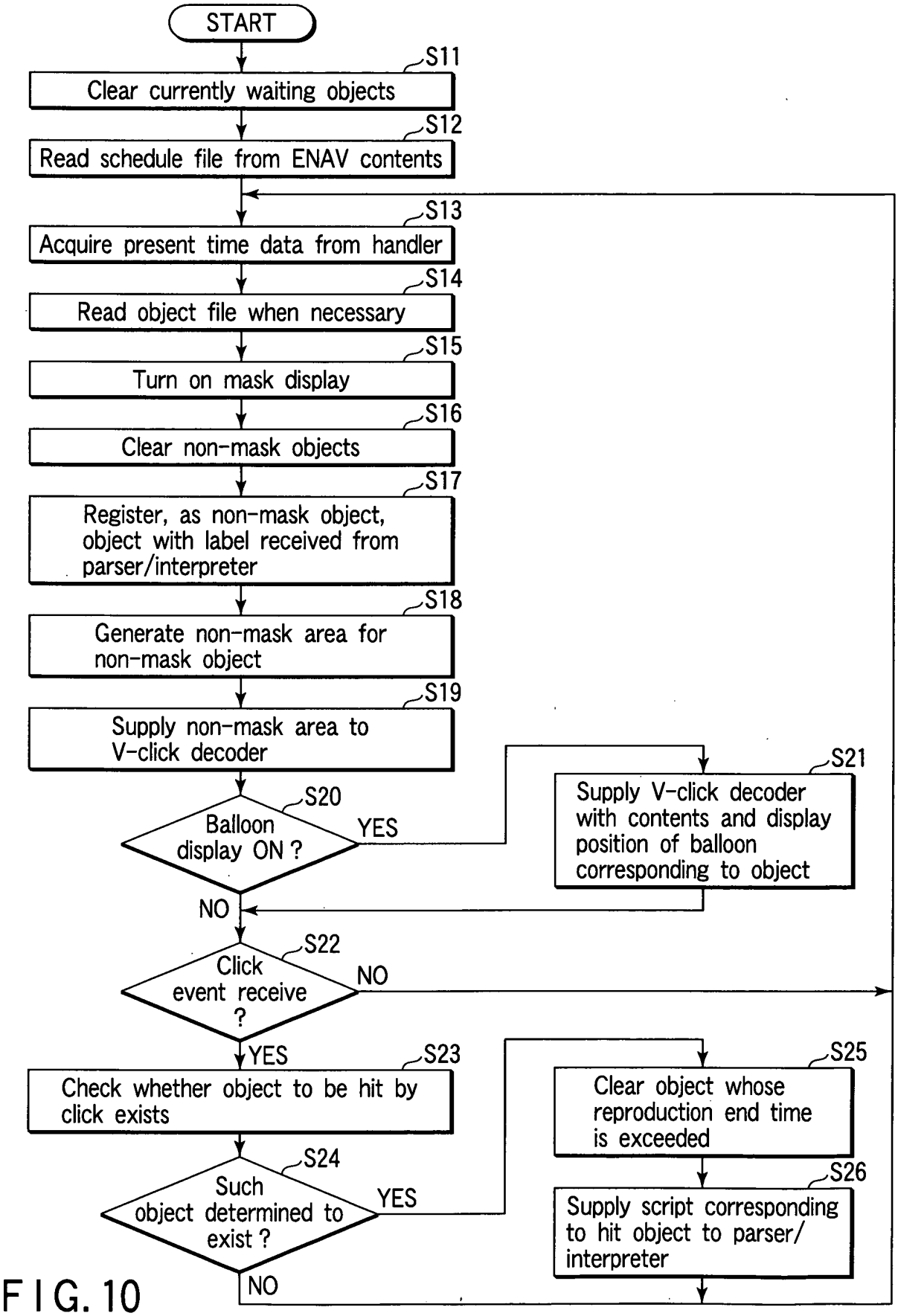
START
S11
Clear currently waiting objects
S12
Read schedule file from ENAV contents
S13
Acquire present time data from handler
S14
Read object file when necessary
S15
Turn on mask display
S16
Clear non-mask objects
S17
Register, as non-mask object, object with label received from parser/interpreter
S18
Generate non-mask area for non-mask object
S19
Supply non-mask area to V-click decoder
S20
Balloon display ON ?
YES
NO
S21
Supply V-click decoder with contents and display position of balloon corresponding to object
S22
Click event receive ?
NO
YES
S23
Check whether object to be hit by click exists
S24
Such object determined to exist ?
YES
NO
S25
Clear object whose reproduction end time is exceeded
S26
Supply script corresponding to hit object to parser/interpreter

FIG. 10

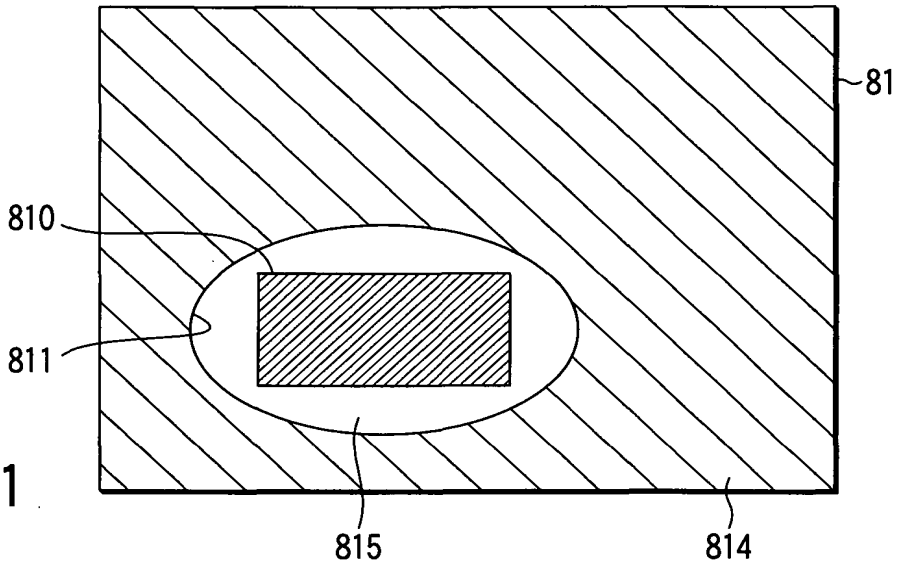

FIG. 11

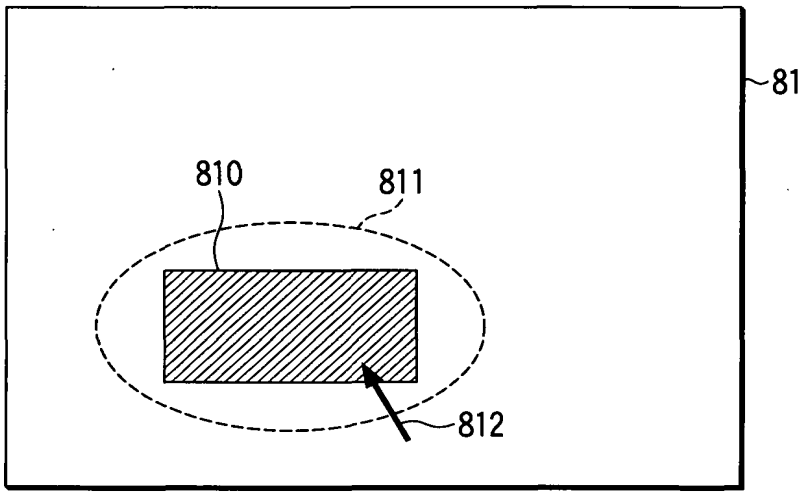

FIG. 12

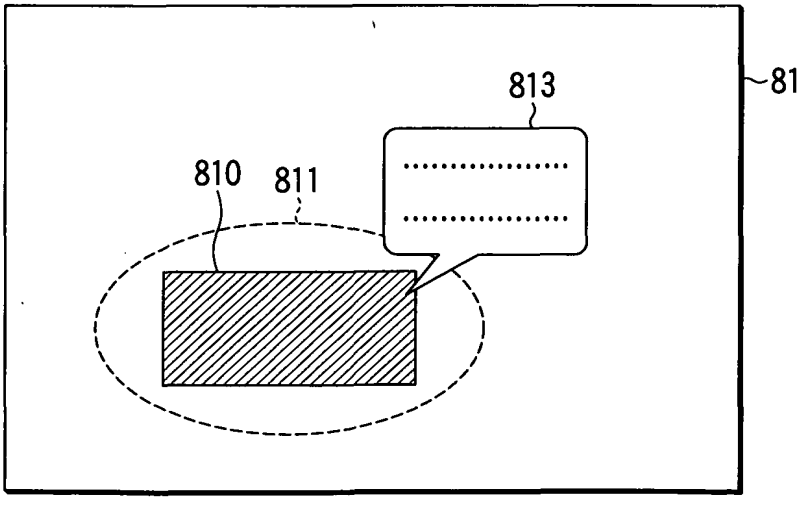

FIG. 13

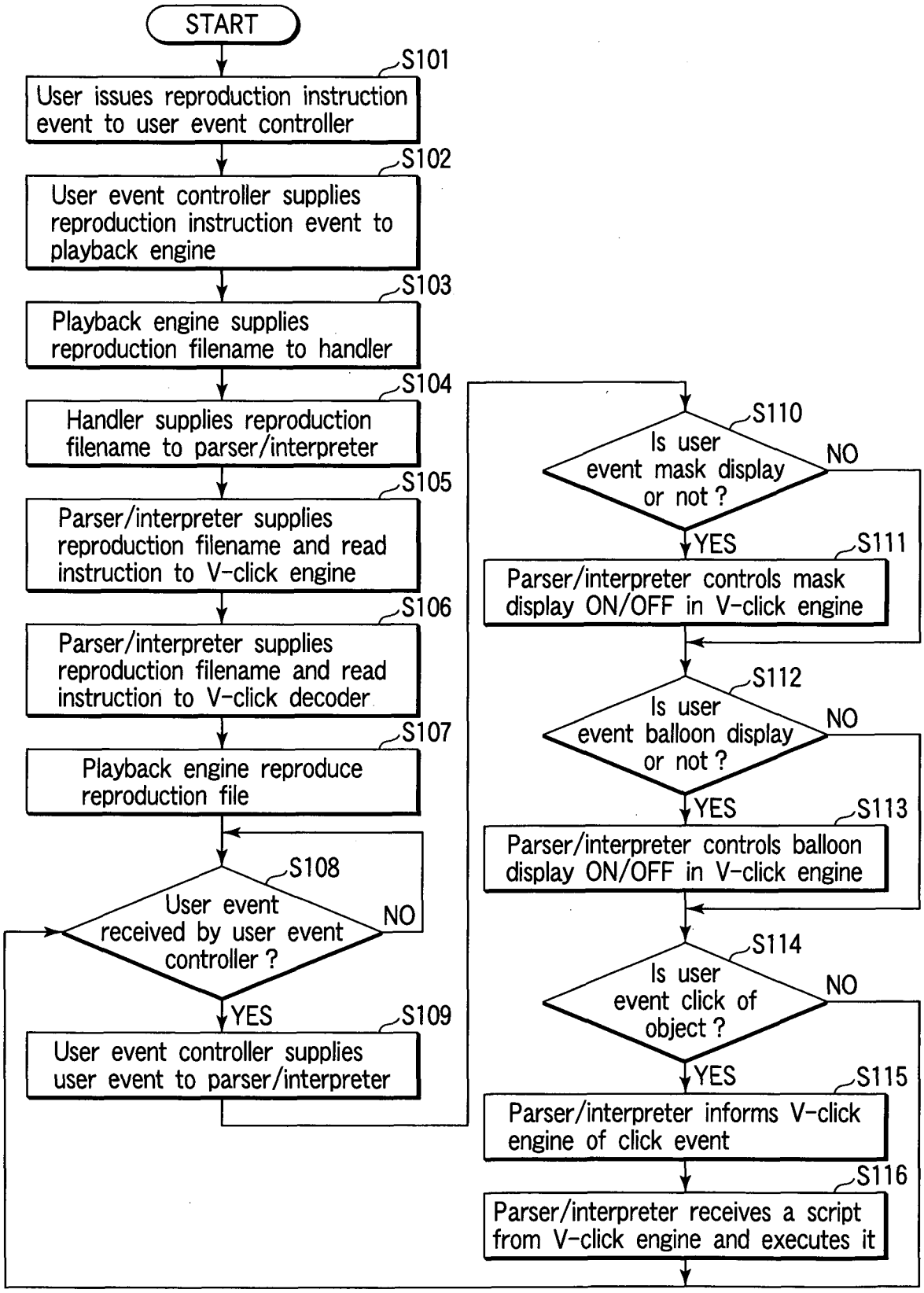
START
S101
User issues reproduction instruction event to user event controller
S102
User event controller supplies reproduction instruction event to playback engine
S103
Playback engine supplies reproduction filename to handler
S104
Handler supplies reproduction filename to parser/interpreter
S105
Parser/interpreter supplies reproduction filename and read instruction to V-click engine
S106
Parser/interpreter supplies reproduction filename and read instruction to V-click decoder
S107
Playback engine reproduce reproduction file
S108
User event received by user event controller ?
NO
YES
S109
User event controller supplies user event to parser/interpreter
S110
Is user event mask display or not ?
NO
YES
S111
Parser/interpreter controls mask display ON/OFF in V-click engine
S112
Is user event balloon display or not ?
NO
YES
S113
Parser/interpreter controls balloon display ON/OFF in V-click engine
S114
Is user event click of object ?
NO
YES
S115
Parser/interpreter informs V-click engine of click event
S116
Parser/interpreter receives a script from V-click engine and executes it

FIG. 14

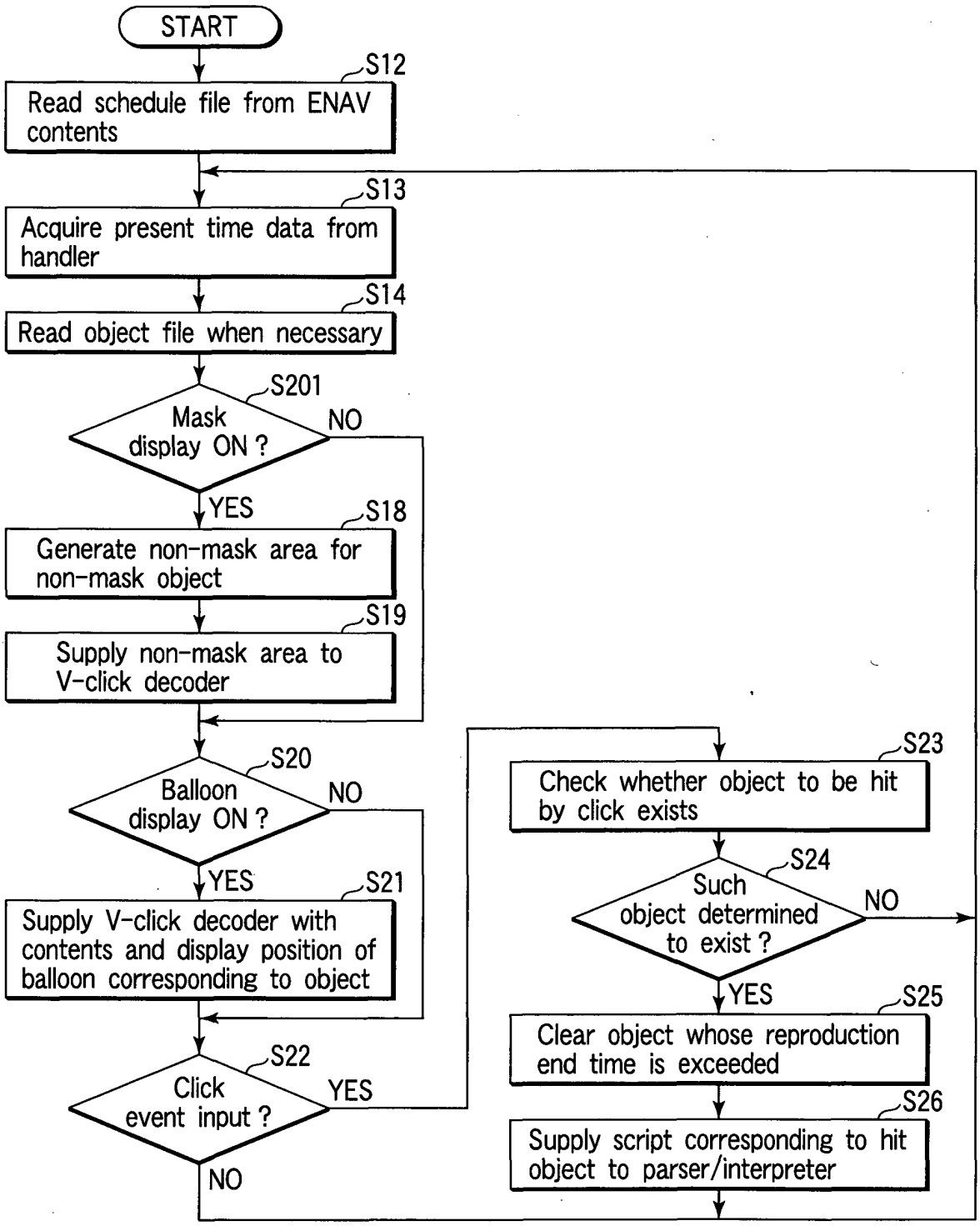
START
S12
Read schedule file from ENAV contents
S13
Acquire present time data from handler
S14
Read object file when necessary
S201
Mask display ON ?
NO
YES
S18
Generate non-mask area for non-mask object
S19
Supply non-mask area to V-click decoder
S20
Balloon display ON ?
NO
YES
S21
Supply V-click decoder with contents and display position of balloon corresponding to object
S22
Click event input ?
YES
NO
S23
Check whether object to be hit by click exists
S24
Such object determined to exist ?
NO
YES
S25
Clear object whose reproduction end time is exceeded
S26
Supply script corresponding to hit object to parser/interpreter

FIG. 15

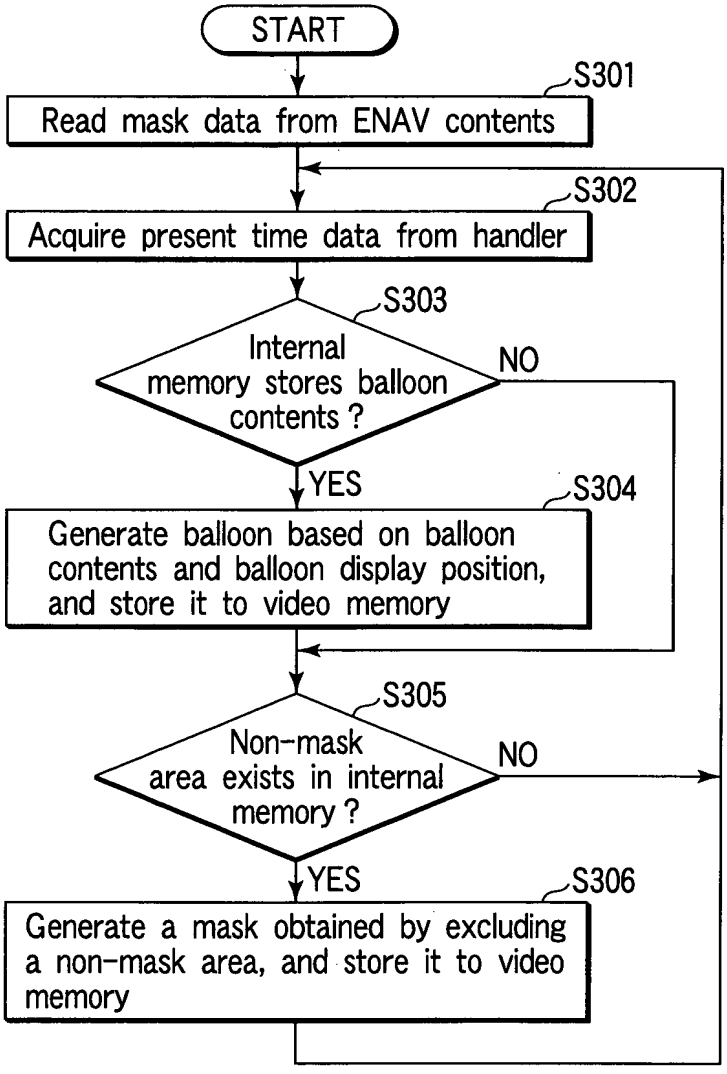
START
S301
Read mask data from ENAV contents
S302
Acquire present time data from handler
S303
Internal memory stores balloon contents ?
NO
YES
S304
Generate balloon based on balloon contents and balloon display position, and store it to video memory
S305
Non-mask area exists in internal memory ?
NO
YES
S306
Generate a mask obtained by excluding a non-mask area, and store it to video memory

FIG. 16

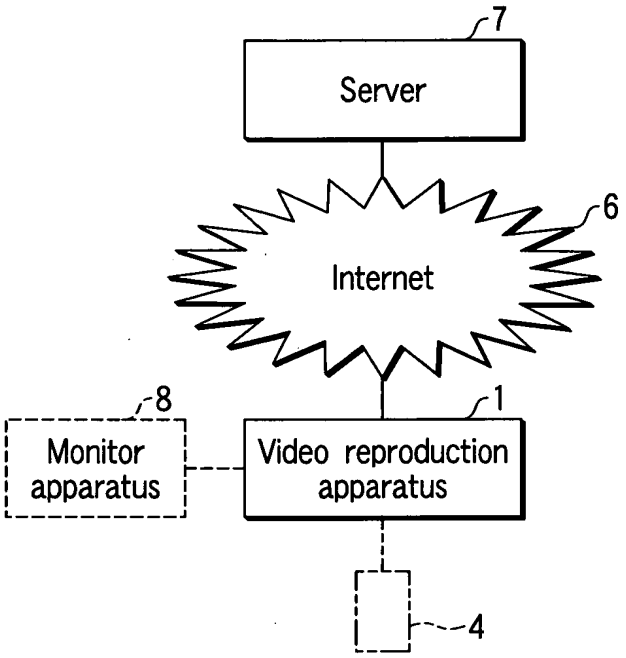

FIG. 17

Contents ID	V-click data
3effd701	Schedule data, Mask data, Object data
4da5b33	Schedule data, Object data

FIG. 19

Contents ID	V-click data
3effd702	http://www.○○○.com/abc.clk
4da5b34	http://www.□□□.org/123.clk

FIG. 20

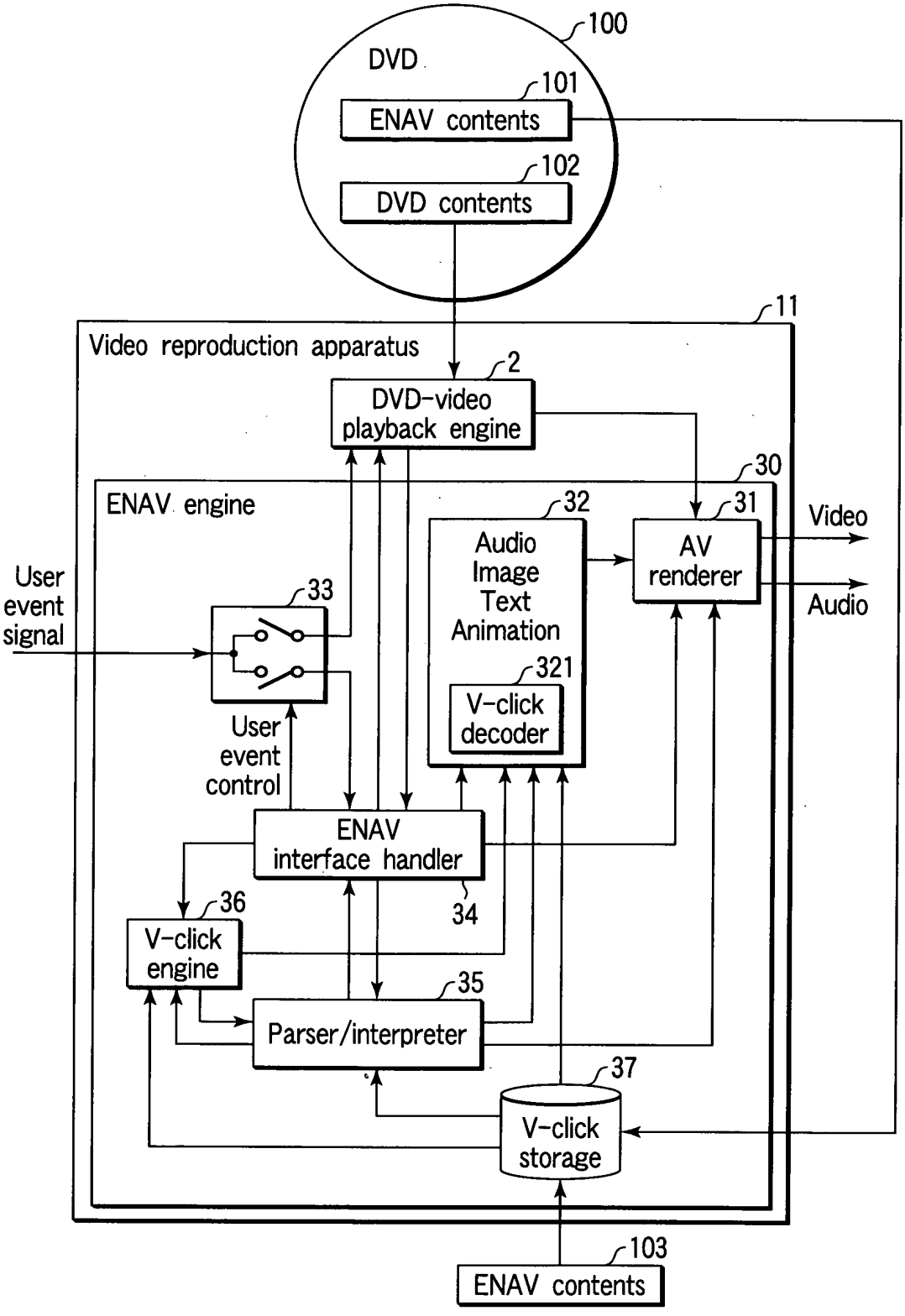
100
DVD
101
ENAV contents
102
DVD contents
11
Video reproduction apparatus
2
DVD-video playback engine
30
ENAV engine
32
Audio Image Text Animation
321
V-click decoder
31
AV renderer
Video
Audio
User event signal
33
User event control
ENAV interface handler
34
36
V-click engine
35
Parser/interpreter
37
V-click storage
103
ENAV contents

FIG. 18

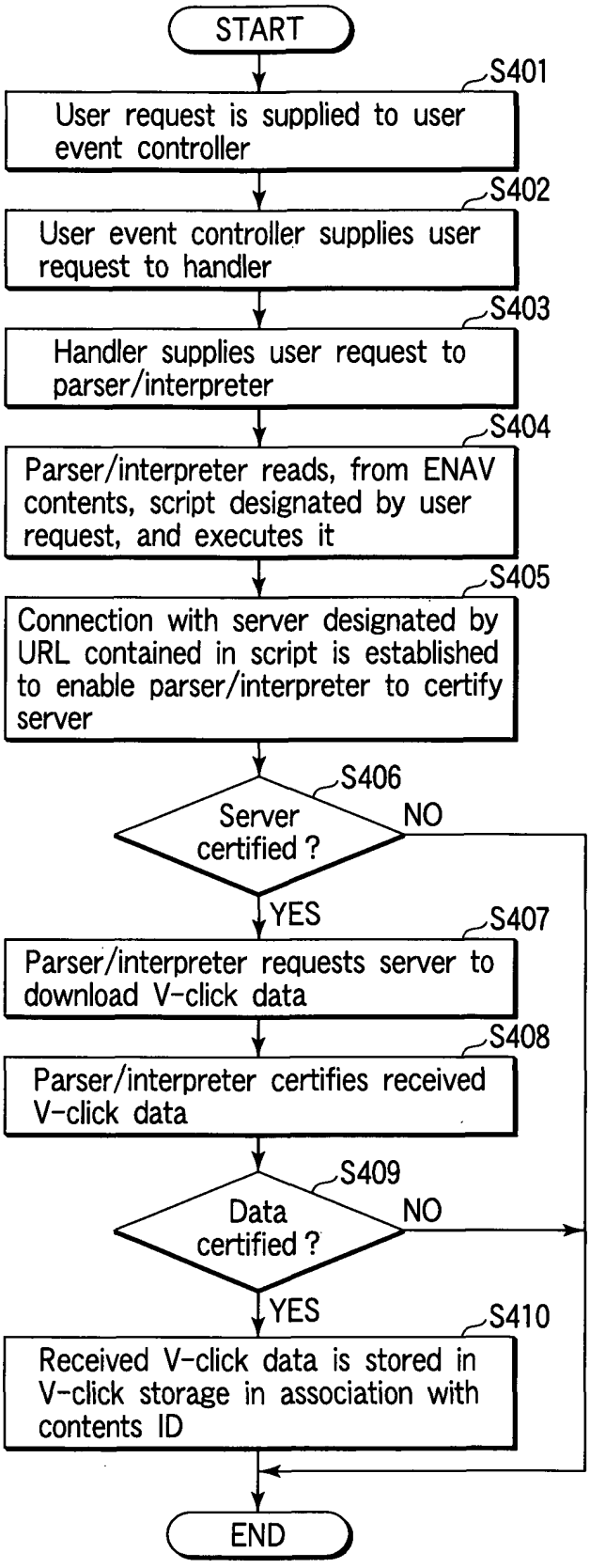
START
S401
User request is supplied to user event controller
S402
User event controller supplies user request to handler
S403
Handler supplies user request to parser/interpreter
S404
Parser/interpreter reads, from ENAV contents, script designated by user request, and executes it
S405
Connection with server designated by URL contained in script is established to enable parser/interpreter to certify server
S406
Server certified ?
NO
YES
S407
Parser/interpreter requests server to download V-click data
S408
Parser/interpreter certifies received V-click data
S409
Data certified ?
NO
YES
S410
Received V-click data is stored in V-click storage in association with contents ID
END

FIG. 21

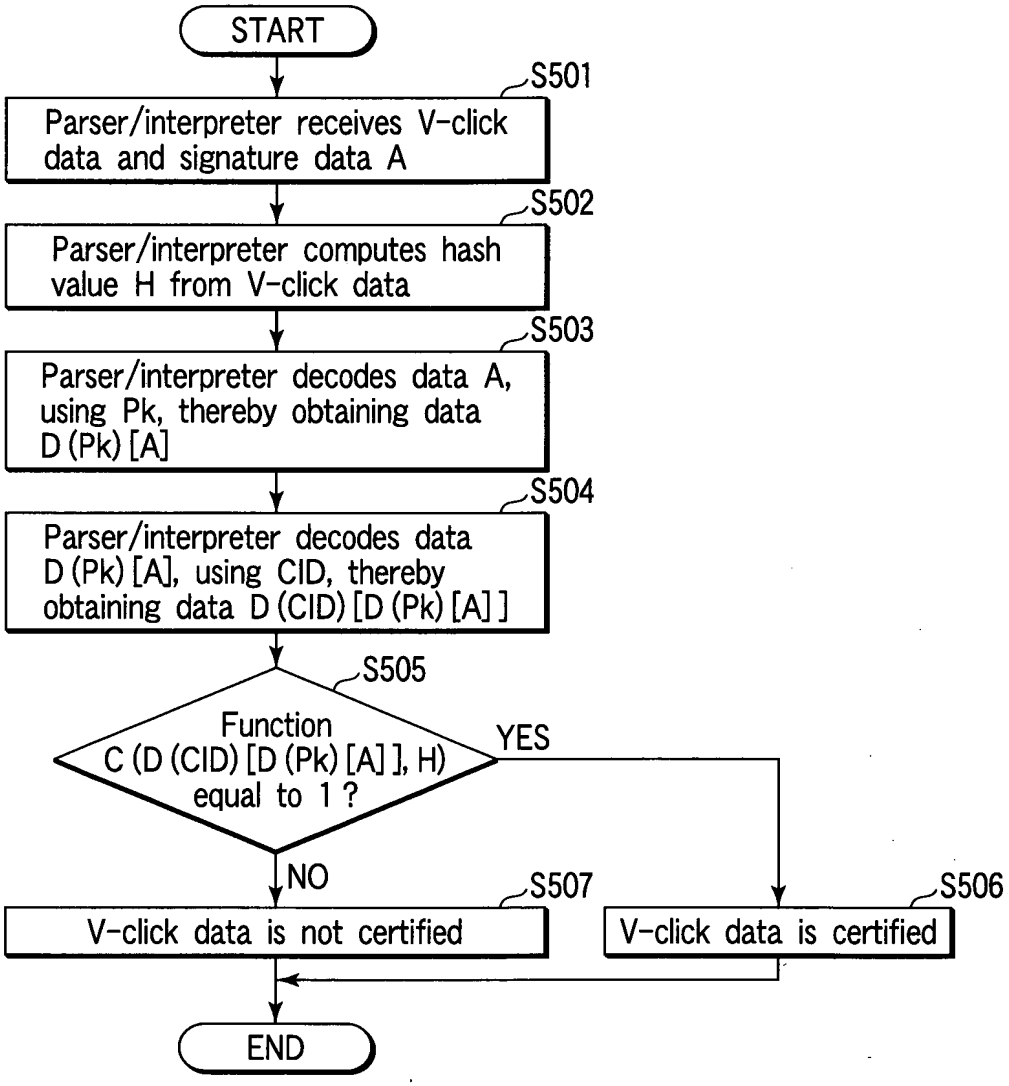
START
S501
Parser/interpreter receives V-click data and signature data A
S502
Parser/interpreter computes hash value H from V-click data
S503
Parser/interpreter decodes data A, using Pk, thereby obtaining data D (Pk) [A]
S504
Parser/interpreter decodes data D (Pk) [A], using CID, thereby obtaining data D (CID) [D (Pk) [A]]
S505
Function C (D (CID) [D (Pk) [A]], H) equal to 1 ?
YES
NO
S507
V-click data is not certified
S506
V-click data is certified
END

FIG. 22